PRO1250D CT MODBUS MID

Three phase four wire energy meter.

User manual

Version 1.11

DMMetering®

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1 Safety instructions

Information for your own safety
This manual does not contain all of the safety measures for operation of this meter because special operating conditions, local code requirements or local regulations may necessitate further measures. However, it does contain information which must be adhered to for your own personal safety and to avoid material damage. This information is highlighted by a warning triangle with an exclamation mark or a lightning bolt depending on the degree of actual or potential danger:

Warning
This means that failure to observe the instruction can result in death, serious injury or considerable material damage.

Caution
This means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Qualified personnel
Installation and operation of the device described in this manual may only be performed by qualified personnel. Only people that are authorized to install, connect and use this device, who have the proper knowledge about labeling and grounding electrical equipment and circuits and can do so in accordance with local (safety) regulations, are considered qualified personnel in this manual.

Use for the intended purpose
This device may only be used for the application cases specified in the catalog and the user manual and only in connection with devices and components recommended and approved by Inepro Metering B.V.

Proper handling
The prerequisites for perfect, reliable operation of the product are proper transport, storage, installation and connection, as well as proper operation and maintenance. During its operation certain parts of the meter might carry dangerous voltages.

- Only use insulated tools suitable for the voltages this meter is used for.
- Do not connect while the circuit is connected to a power or current source.
- Only place the meter in a dry environment.
- Do not mount the meter in an explosive area or exposed to dust, mildew and/or insects.
- Make sure the used wires are suitable for the maximum current of this meter.
- Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- Do not touch the meter's connection clamps directly with your bare hands, with metal, blank wire or other conducting material as you will risk an electric shock that could cause possible injury, serious injury or death.
- Make sure the protection covers are replaced after installation.
- Maintenance and repair of the meter should only be carried out by qualified personnel.
- Never break any seals (if present on this meter) to open the front cover as this might influence the functionality or accuracy of the meter, and will void all warranty.
- Do not drop, or allow physical impact to the meter as there are high precision components inside that may break and affect the meter measurement negatively.
- All clamps should be properly tightened.
- Make sure the wires fit properly in the connection clamps.
- If the wires are too thin it will cause a bad contact which can spark causing damage to the meter and its surroundings.

Exclusion of liability
We have checked the contents of this manual and every effort has been made to ensure that the descriptions are as accurate as possible. However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors or omissions in the information given. The data in this manual are checked regularly and the necessary corrections will be included in subsequent editions. If you have any suggestions, please do not hesitate to contact us.

Subject to technical modifications without notice.

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2 Foreword

Thank you for purchasing this energy meter. Inepro has a wide product range of devices. We have introduced a large number of energy meters on the market suitable for 110V AC to 400V AC (50 or 60Hz). Besides the normal energy meters we also developed our own pre-paid meters with chip card, chip card re-loaders and a complete PC management control system. For more information on other products please contact our sales department at sales@ineprometering.com or visit our website at www.ineprometering.com.

Although we produce this device according to international standards and our quality inspection is very accurate it's still possible that this device shows a defect or failure for which we do apologize. Under normal conditions your product should give you years of trouble free operation. In case there is a problem with the energy meter you should contact your distributor immediately. Most of our energy meters are sealed with a special seal. Once this seal is broken there is no possibility to claim any warranty. Therefore NEVER open an energy meter or break the seal of the device. The warranty period is 3 years after production, and only valid for production faults.

3 MID certificate

KEMA

CERTIFICATE

EC-Type examination certificate 6990-11

Manufacturer	:	Inepro Metering BV
Contact person	:	D. van der Vaart
Address	:	P.O. Box 92
Postal code, Place	:	2450 AB, Leimuiden
Country	:	The Netherlands

Instrument	:	Electronic three-phase four-wire energy meter Transformer connected		
Mark - Type	:	PRO1250D CT	PRO1250D CT MODBUS	PRO1250D CT MBUS
Register	:	LCD		
Accuracy Class	:	1 / B		
Measurement range	:	230/400 V 1,5(6) A 50 or 60 Hz 1600 imp./kWh		
	:	-25..55 °C		
Use	:	Indoor		
Protection Class	:	II		
Registry method	:	The meter is suitable for energy registration in one direction only.		

The energy meter meets the requirements of:

IEC 62052-11 (2003)	:	Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Metering equipment
IEC 62053-21 (2003)	:	Electricity metering equipment (a.c.) - Static meters for active energy (classes 1 and 2)

Based on a non-recurrent examination.

The results are recorded in our test report with reference 72140347-TIC 6990-11.

KEMA Nederland B.V. - Calibration & Metering
Arnhem, August 15, 2011

ir. A.P.M. Baars
Certification manager

ing. S.A.M. Verhoeven
Director Testing, Inspections & Certification
Certificate nr. 72140347-TIC 6990-11C

The investigation reported here does not confer any right to use an approbation mark granted by KEMA.

Integral publication of this certificate and adjoining reports is allowed.
This certificate is issued provided that neither KEMA nor the RvA assumes any liability.

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Experience you can trust.

4 CE certificates

We,

Inepro Metering BV

Pondweg 7
2153 PK Nieuw-Vennep
The Netherlands

declare under our sole responsibility that the products:

PRO1250D
PRO1250D MODBUS
PRO1250D MBUS

Three phase DIN rail Watt Hour Meter

to which this declaration relates in conformity with the following European harmonized and published standards at date of this declaration:

IEC EN 50470

Following the provisions of the Directives (if applicable):

☑ 2004/22/EC

These conclusions are based on the test reports done by KEMA with report numbers : 6375-10, 6376-10 and 6990-11 with Notified Body number 0344

Nieuw-Vennep, 2011, April 14

Place and date of issue

This declaration of Conformity is suitable to the European Standard EN 45014 *General Criteria for Supplier's Declaration of Conformity*. The basis for the criteria has been found in international documentation, particularly in ISO / IEC, Guide 22, 1982, *Information on manufacturer's Declaration of Conformity with standards or other technical specifications*

Declaration of Conformity

We

Inepro Metering BV

Of

Inepro Metering BV
Pondweg 7
2153 PK Nieuw Vennep
The Netherlands

Ensure and declare that the apparatus:

PRO1250D CT, PRO1250D CT Modbus, PRO1250D CT Mbus

With the measurement range

230/400V, 1.5(6)A, 50/60Hz, 1600imp/kWh

are in conformity with the type as described in the

EC-type examination certificate 6990-11

and satisfy the appropriate requirements of the Directive 2004/22/EC.

August 15, 2011

Daan van der Vaart

5 Performance criteria

Operating humidity	≤ 75%
Storage humidity	≤ 95%
Operating temperature	-25°C - +55°C
Storage temperature	-25°C - +55°C
International standard	EN50470-1 and 3
Accuracy class	1
Protection against penetration of dust and water	IP51
Insulating encased meter protective class	II

6 Specifications

Meter type	PRO1250D CT MODBUS MID
Nominal voltage (Un)	230/400V AC (3~)
Operational voltage	161/279V ~ 300/520V
Insulation capabilities:	
- AC voltage withstand	4kV for 1 minute
- Impulse voltage withstand	6kV – 1.2µS waveform
Basic current (Ib)	1,5 A
Maximum rated current (Imax)	6 A
Operational current range	0.4% Ib- Imax
Peak current withstand	30Imax for 0.01s
Operational frequency range	50 or 60 Hz ±10%
Internal power consumption	≤2W / 10VAper phase
Test output flash rate (PULSE LED)	1600 imp/kWh
Pulse output rate	1600 imp/kWh
Data save	The data can be stored more than 10 years without power.

7 Basic errors

With balanced loads

0.05Ib	Cosφ = 1	±1.5%
0.1Ib	Cosφ = 0.5L	±1.5%
Cosφ = 0.8C		±1.5%
0.1Ib - Imax	Cosφ = 1	±1.0%
0.2Ib - Imax	Cosφ = 0.5L	±1.0%
Cosφ = 0.8C		±1.0%

With single phase load

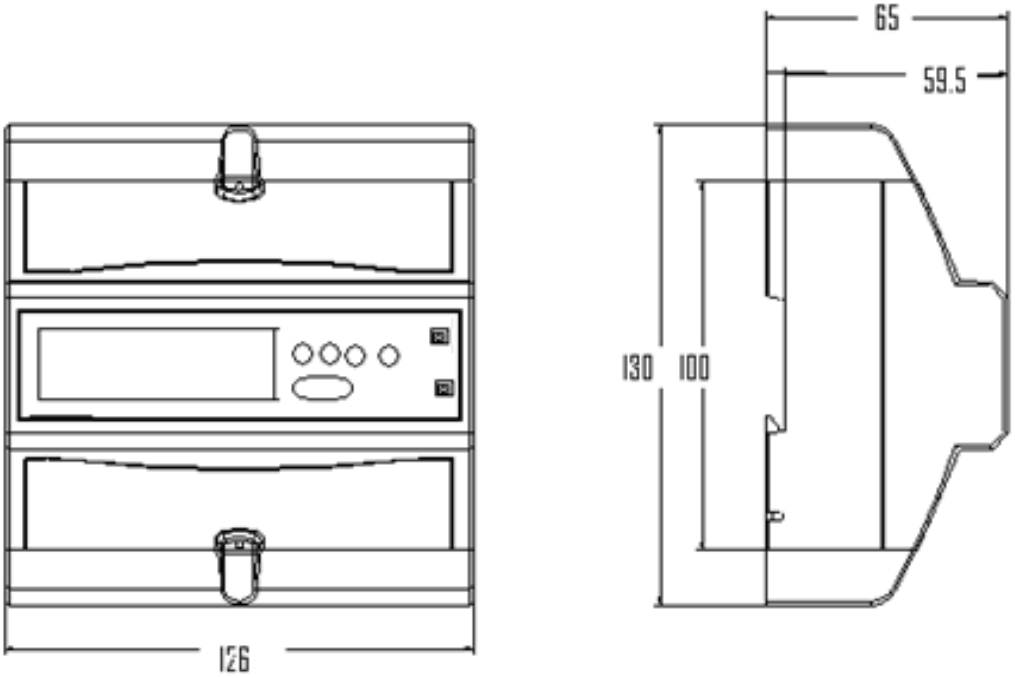
0.1Ib - Imax	Cosφ = 1	±2.0%
0.2Ib - Imax	Cosφ = 0.5L	±2.0%

8 Description

A	Front panel
B	Cover
C	Case
D	Security wire slot

Material

Front panel	PC flame resistant plastic
Cover	ABS flame resistant plastic
Case	ABS flame resistant plastic



9 Dimensions

Height	100 mm
Height with protection cover	130 mm
Width	126 mm
Depth	65 mm
Size of the connection clamps	10 x 8 mm
Weight	0,7 kg (net)

10 RS485 communication specifications

Bus type	RS485
Protocol	MODBUS RTU with 16 bit CRC
Baud rate	1200（default), 2400, 4800, 9600
Address range	0-255 user settable
Maximum bus load	64 meters per bus
Range	1000m

11 Far Infrared communication specifications

Infrared wavelengths	900- 1000nm
baud rate	1200bps
Communication distance	5m
Communication angle	-15°~+15°
Protocol	Modbus

12 Installation

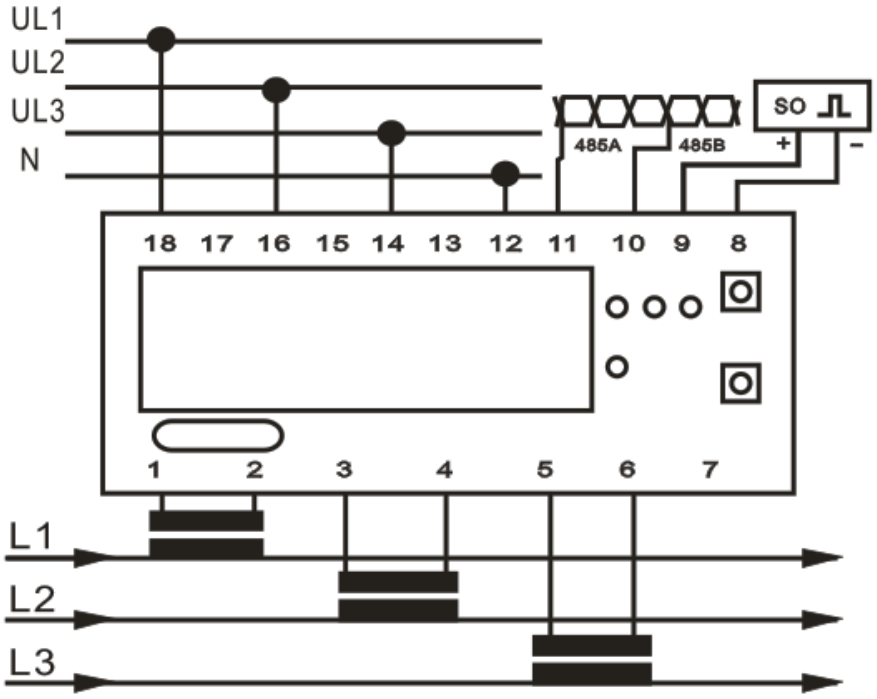
CAUTION

- Turn off and if possible lock all sources supplying the energy meter and the equipment that is connected to it before working on it.
- Always use a properly rated voltage sensing device to confirm that power is off.

WARNING

- The installation should be performed by qualified personnel familiar with applicable codes and regulations.
- Use isolated tools to install the device.
- A fuse, thermal cut-off or single-pole circuit breaker should be fitted on the supply line and not the neutral line.

- The connecting wire, connecting the device to the outside circuit, should be sized according to local regulations for the maximum amount of the current breaker or other overcurrent protection devices used in the circuit.
- We recommend that the connecting wire which is used to connect meter to the outside circuit should be sized according to local codes and regulations for the maximum amount of current of the circuit breaker or other over current protection device used in the circuit.
- An external switch or a circuit-breaker should be installed on the supply wires, which will be used to disconnect the meter and the device supplying energy. It is recommended that this switch or circuit-breaker is placed near the meter because that is more convenient for the operator. The switch or circuit-breaker should comply with the specifications of the building's electrical design and all local regulations.
- An external fuse or thermal cut-off used as an over current protection device for the meter must be installed on the supply side wires. It's recommended that this protection device is also placed near the meter for the convenience of the operator. The overcurrent protection device should comply with the specifications of the building's electrical design and all local regulations.
- This meter can be installed indoor, or outdoor enclosed in a meter box which is sufficiently protected, in accordance with local codes and regulations.
- To prevent tampering, an enclosure with a lock or a similar device can be used.
- The meter has to be installed against a fire resistant wall.
- The meter has to be installed in a well ventilated and dry place.
- The meter has to be installed in a protective box if the meter is exposed to dust or other contaminants.
- The meter can be installed and used after being tested and can be sealed afterwards.
- The device can be installed on a 35mm DIN rail.
- The meter should be installed on a location where the meter can be read easily.
- In case the meter is installed in an area with frequent surges for example due to



thunderstorms, welding machines, inverters etc, the meter should be protected with a Surge Protection Device.

- The black pins, closing the (protection) covers, are made as placeholders, please use these accordingly
- The device should be sealed immediately after installing it in order to prevent tampering
- Connection of the wires should be done in accordance with the connection diagram as shown below

18	UL1
16	UL2
17	UL3
S0	Pulse
N	Neutral
1 and 2	CT for L1
3 and 4	CT for L2
5 and 6	CT for L3
18/16/14/12	UL1、UL2、UL3 and Neutral N
8 and 9	Pulse output contact (N)
7	Not in use
11/13/15	Not in use
17/10	Not in use
10(B)/11(A)	RS485 communication contact

13 Operation

13.1 Working indication

On the front panel, there are three power indication LEDs which have different colors. The yellow LED represents phase L1; the green LED represents phase L2; the red LED represents phase L3. The three LED's will burn in case all the phases are working normally.

13.2 Consumption indication

There is a red LED at the right side of the display with the text (1600 imp/kWh), which displays the consumption measured by the meter. When power is consumed, the LED will flash. The faster the LED flashes, the more power is consumed. For this meter, the LED will flash 1600 times per kWh. Please note that the meter is not suitable for reverse energy.

13.3 Reading the meter

The meter has a 7 digit LCD which had a variable decimal count. The meter is equipped with a 6+1 register. This means it can display 1 digit after the dot. In case the meter is programmed at a 5/5 CT ratio, starting from 200/5, the meter has 7+0 display. The meter cannot be set to zero.

13.4 RS485 output

The meter has a isolated RS485 port on connection 8 and 7. To communicate with a computer, computer software and an RS485 adapter is required. The transmission speed is 1200 baud (default) but can be increased to 2400, 4800, 9600 baud.

Note: PC software is available at request. Please see the technical support section of this manual for more information.

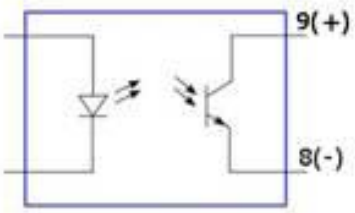
13.5 Far infrared communication port

The far infrared communication port is under on the left bottom side of LCD screen. The TP800 hand-held programmer can directly communicate with this meter via infrared. The communication distance can't be more than 5m.

Note on using Modbus (R485) and Infrared signals simultaneously is only possible if a 1200 baudrate of the R485 has been set, see section 15.

13.6 Pulse output

The energy meter is equipped with a pulse output which is fully separated from the inside circuit, and it generates pulses in proportion to the measured energy. In default setting, the meter pulses 1600 times per KWh with the CT ratio being 5/5. If the CT ratio is changed, the pulse output will be divided by the ratio chosen, if the ratio is 250/5 for example the pulse rate will be 1600/50=32 pulses per kWh. The test pulse output is a polarity dependent, open collector, transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (Ui) should be 5-27V DC, and the maximum input current (Imax) should be 27mA DC. To connect the impulse output, connect 5-27V DC to connector 9 (collector), and the signal wire (S) to connector 8 (emitter). The pulse meter is located on the front panel immediately on the right side of the display with the text (1600 imp/kWh).



8 =pin 8 (emitter)
9 =pin 9 (collector)

=light bundle from the LED

14 CT ratio settings

How to set the CT ratio of the meter
The default CT ratio is 5:5. In case you want to change the CT ratio to another setting, you have 27 options, but you can only change the default CT-ratio once for this meter. It's advised to set the CT-ratio immediately after installing the meter.

NOTE: For security reasons, it is only possible to change the CT ratio in the first 30 seconds after the meter has been turned on. After 30 seconds the PRG button doesn't allow any changes. Furthermore, because of MID regulations it is only possible to change the CT ratio once, after the CT ratio has been set-up it is locked and can only be reset by the manufacturer.

Procedures for changing the CT ratio of the meter:
1. Wire the meter correctly according to section 13. The meter will start and the LCD display will show the following: "88888.8.8." and after a second "5-5"
3. Press the PRG button after the meter has started. Then you can set the CT ratio by pressing the SEL button., The LCD will for example show the following:"- 3000/5"
4. You can choose from the following options: 5/5 50/5 60/5 75/5 100/5 125/5 150/5 200/5 250/5 300/5 400/5 500/5 600/5 750/5 800/5 1000/5 1200/5 1250/5 1500/5 2000/5 2500/5 3000/5.
5. After you selected the CT Ratio, press the PRG button to confirm and complete the ratio setting. The LCD will display "-END".
6. The meter will go back to the normal display if you didn't press the PRG button within 30 seconds, and the LCD will show the energy consumption and CT ratio consecutively.

15 Troubleshooting

CAUTION

- During repair and maintenance, do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other conducting material as that will cause an electric shock and possibly cause injury, serious injury or even death.
- Turn off and if possible lock all sources supplying the energy meter and the equipment that is connected to it before opening the protection cover and working on it.
- Turn off and lock all power supply to the energy meter and the equipment to which it is installed before opening the protection cover to prevent the hazard of electric shock.

WARNING

- Maintenance or repair should only be performed by qualified personnel familiar with applicable codes and regulations.
- Use insulated tools to maintain or repair the meter.
- Make sure the protection cover is in place after maintenance or repair.
- The case is sealed, failure to observe this instruction can result in damage to the meter.

Problem	**Possible cause**	**Check/Solution**
The power supply indicators (L1, L2 & L3 LED) are off.	The meter is not connected to a power source	Are the fuses or/and surge protection defect?
	L1, L2, L3 and N are not connected correctly	Make sure the wires are connected properly and tighten the screws if possible.
	There is no 230V AC between the N and one of the L connections when power is supplied to the meter.	Check if there is 230V AC voltage between N and one of the L connections with a volt meter.
	There is no 400V AC between the L connections when power is supplied to the meter.	Check if there is 400V AC volt between N and one of the L connections with a voltage meter.
		If the checks above don't solve the problem, please contact technical support for a meter replacement.
The red consumption LED is not flashing (PULSE LED).	There is no load connected to the meter.	Connect a load to the meter.
	The load on the line is very low.	Check with an Ohm-meter if the load value is very low.

	There is a fault inside the meter.	If the checks above don't solve the problem, please contact technical support for a meter replacement.
The register doesn't count.	There is almost no load connected to the meter	Check if the consumption LED is flashing. 160 flashes of the LED at 1600 pulses per kWh equals 0.1kWh.
	Maybe there is a fault inside the meter.	Please contact technical support for a meter replacement.
No pulse output.	The pulse output is not supplied with DC power	Check the external voltage source (Ui) is 5-27V DC with a voltage meter
	The pulse output is not connected correctly	Check if the connection is correct: the 5-27V DC should be connected to the collector connection (pin 9 +) and the signal wire (S) to the emitter connection (pin 8-).
	Maybe there is a fault inside the meter.	Please contact technical support for a meter replacement.
The pulse output rate is wrong.	Maybe there is a fault inside the meter.	Please contact technical support for a meter replacement.
RS485 communication is not working.	The meter ID is incorrect	Check and use the correct the meter ID. The default meter ID is 0.
	The RS485 wire is too long to properly communicate with the meter.	Make sure that the length of wire in the RS485 is no more than 1000 meters.
	There are too many devices connected to the same RS485 bus	Check that there are no more than 64 devices or the maximum amount supported by your receiver connected to the bus
	The cables are not correctly connected to the RS485 port	The correct connection is RS485 wire A (D+) to terminal 11, RS485 wire B (D-) to terminal 10.
	The polarity of the cables is wrong	Swap the MODBUS communication wires if you are not sure if the wires are correctly connected
	Unable to change meter ID	Please keep the PRG button on the meter pressed while sending the command to the meter.

	Maybe there is a fault inside the meter.	Please contact technical support for a meter replacement.
Infrared communication not working.	The meter ID is not correct	Check and use the correct the meter ID. The default meter ID is 0.
	The distance between the receiver and the Infrared transmitter is too long.	Make sure the distance between the transmitter and the receiver is no more than 5 meter. Also check if the receiver is in the direct sight of the infrared interface.
	The meter is set at another baudrate than 1200bps using the (RS485) communication port.	Please set the baudrate to the default 1200 bps (see section 13.4)
	The communication protocol used is wrong.	Please contact technical support for a meter replacement.
	Maybe there is a fault inside the meter.	Please contact the technical support to get the meter communication protocol.
The pulse output is rate wrong.	Maybe the CT ratio is different from the default value of 5/5.	Check the CT ratio used, see section 14 in order to change the CT ratio setting.
	Maybe there is a fault in the inside circuit.	Please connect with technical supporter to replace this meter.

16 Technical support

For questions about one of our products please contact:

- Your local Inepro Metering distributor
- Email: support@ineprometering.com

www.ineprometering.com